Ph. Cnidaria

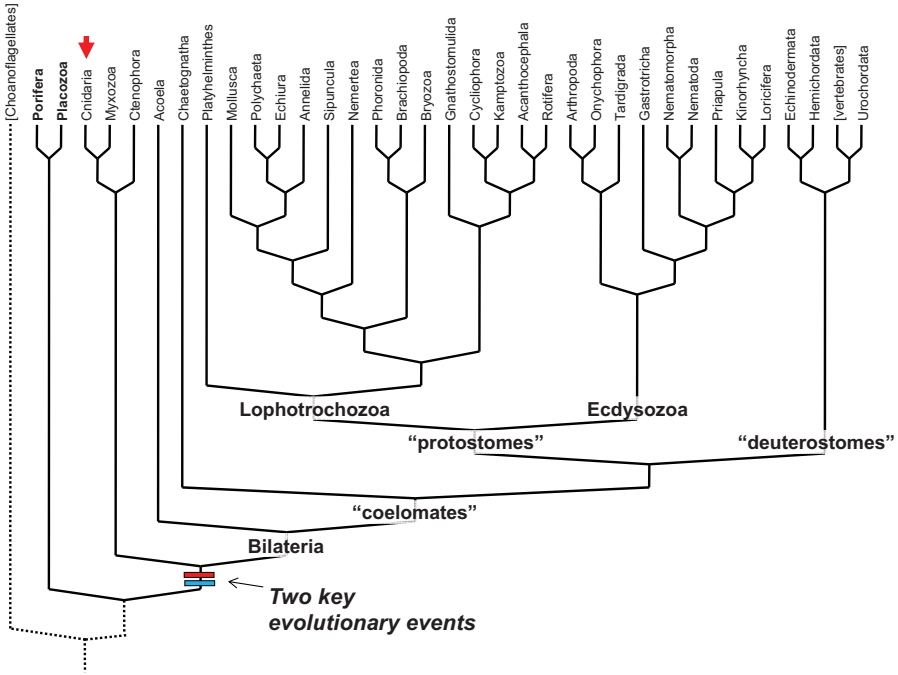
Cl. Hydrozoa
Cl. Anthozoa
Cl. Scyphozoa
Cl. Cubozoa

modular colonies

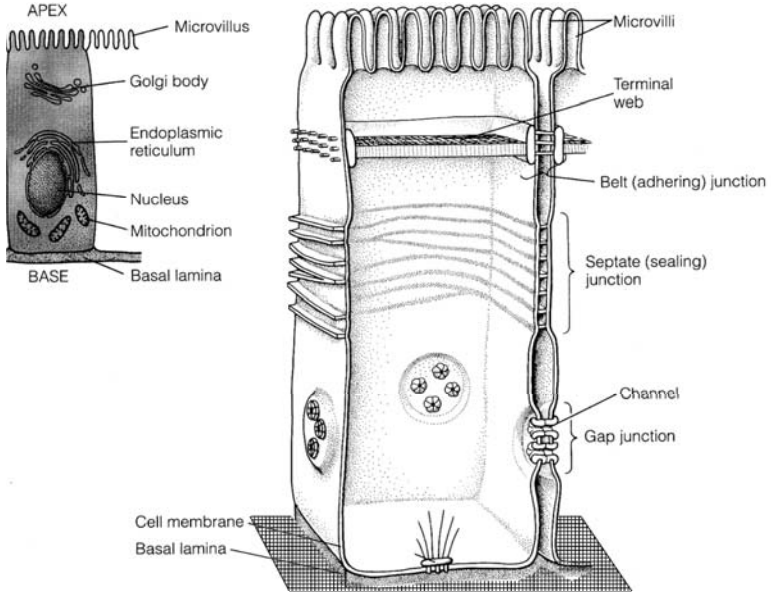
hydroids

corals

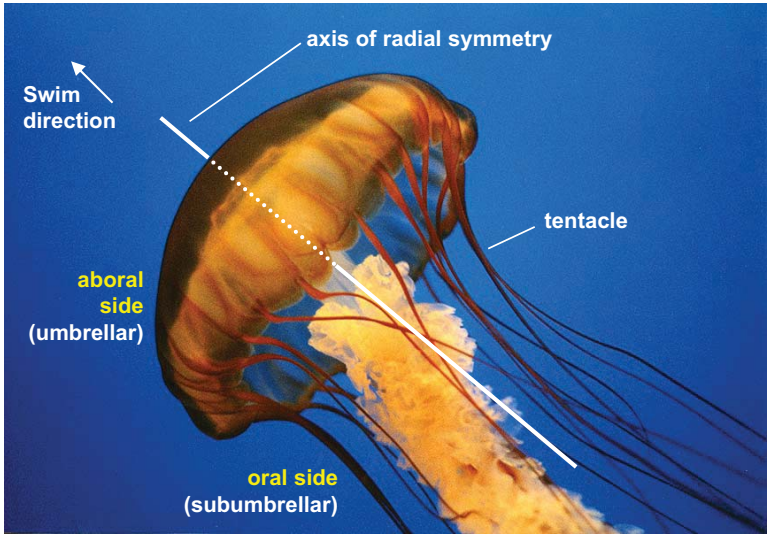
variation in a complicated life cycle



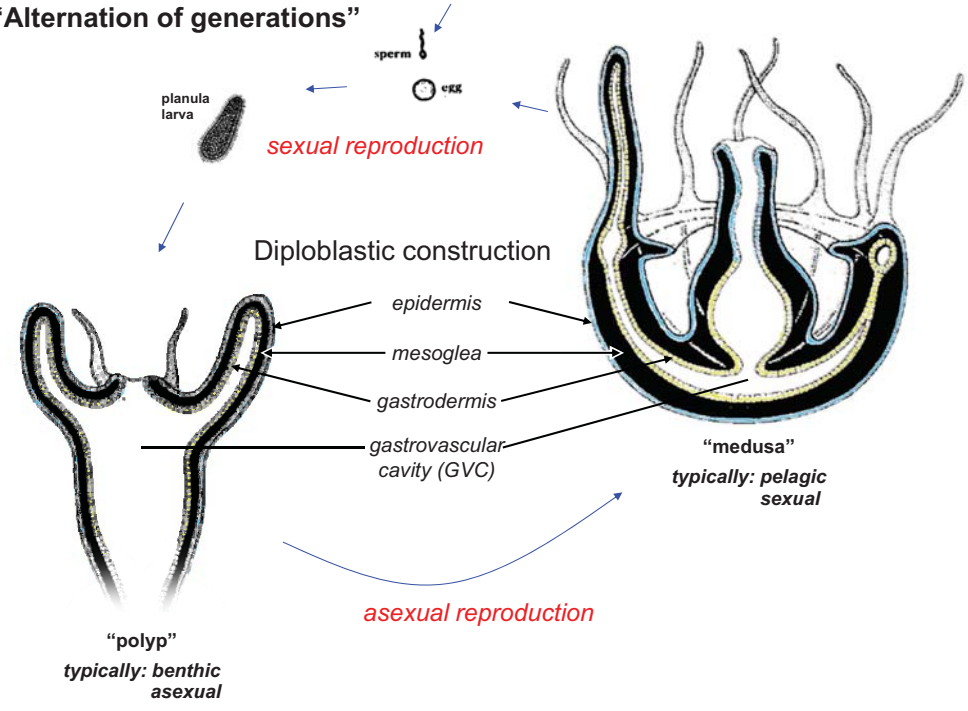
Major event #1: evolution of epithelia

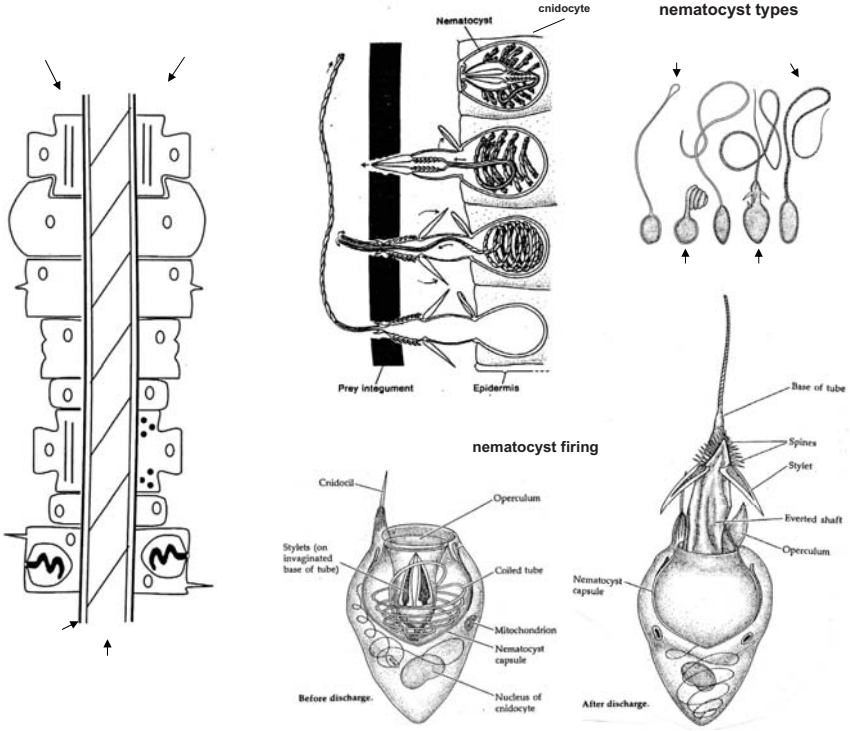


Major event #2: evolution of a body axis



“Alternation of generations”





Ph. Cnidaria

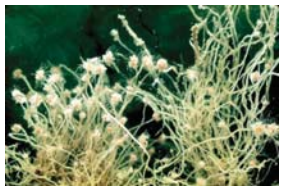
Cl. Hydrozoa
- **colonial hydroids**
- **smaller jellyfish**

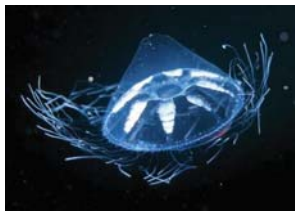
siphonophores

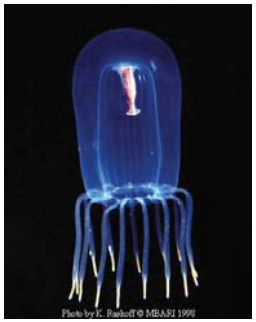
Cl. Anthozoa
sea anemones
corals
sea pens

Cl. Scyphozoa
large jellyfish
stauromedusae

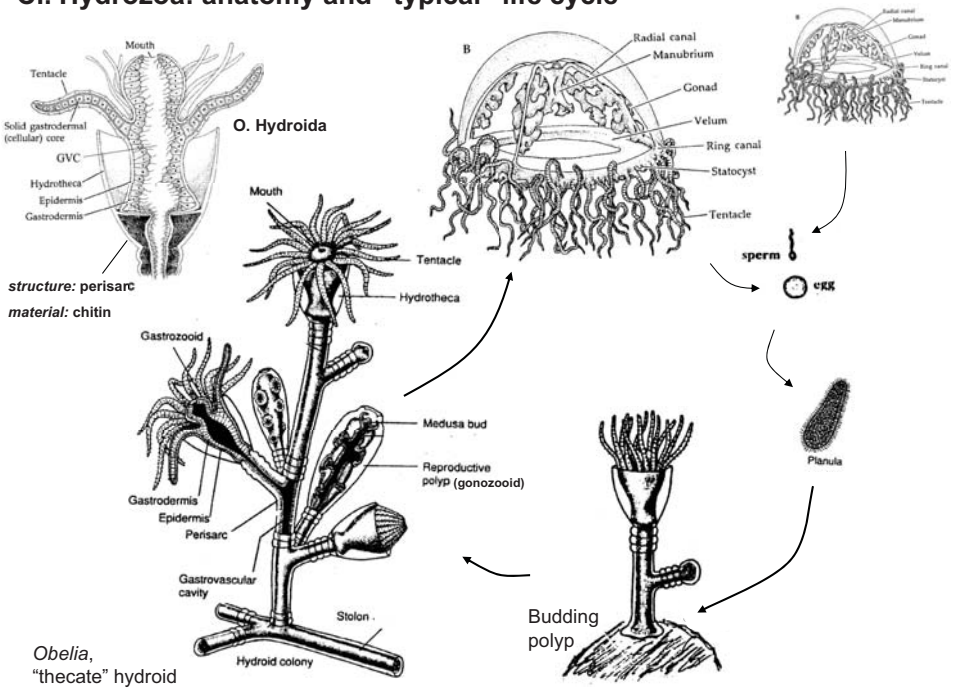
Cl. Cubozoa
sea wasps



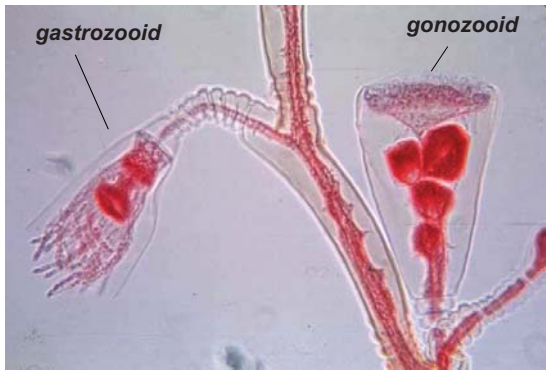




Cl. Hydrozoa: anatomy and “typical” life cycle



Polymorphism and zooid specialization in hydroid colonies



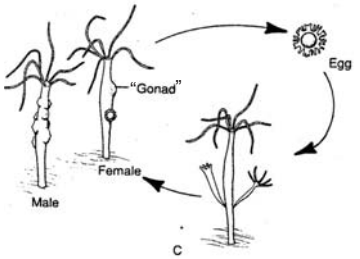
polymorphic (*Gonothyrea sp.*)
separate gastrozooid and gonozooid

monomorphic (*Tubularia larynx*)
medusoids on single zooid type

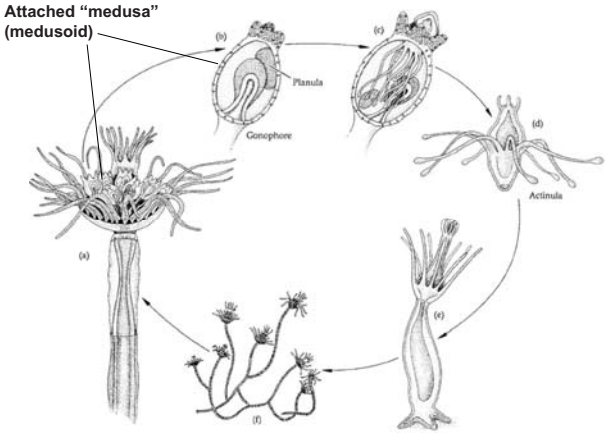
Cl. Hydrozoa: some life cycle alternatives

Are medusa and polyp…
- **present or absent?**
- **sexual or asexual?**
- **pelagic or benthic?**

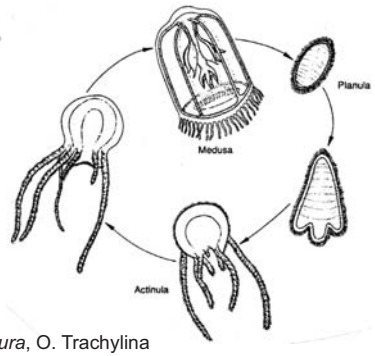
Is the species…
- **if polyp, solitary or colonial?**
- **if colonial, polymorphic or monomorphic?**



Hydra (freshwater)



Tubularia,
"athecate" hydroid



Aglaura, O. Trachylina

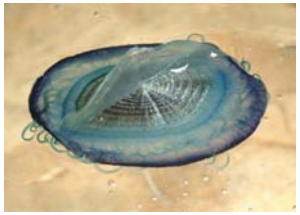
Ph. Cnidaria

Cl. Hydrozoa
colonial hydroids
smaller jellyfish
- **siphonophores**

Cl. Anthozoa
sea anemones
corals
sea pens

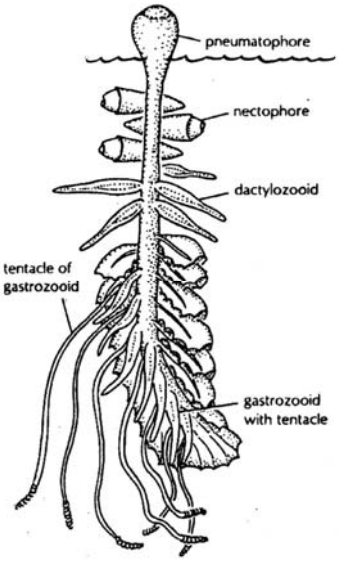
Cl. Scyphozoa
large jellyfish
stauromedusae

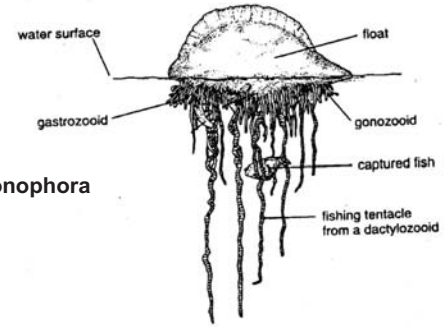
Cl. Cubozoa
sea wasps



- **chondrophores**

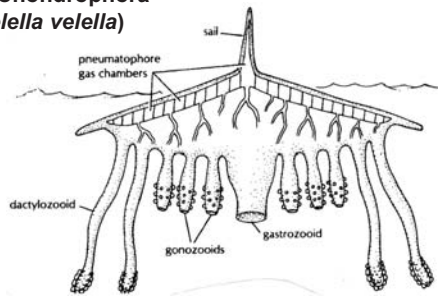
Cl. Hydrozoa: polymorphic pelagic colonies





O. Siphonophora

O. Chondrophora
(*Velella velella*)



Ph. Cnidaria

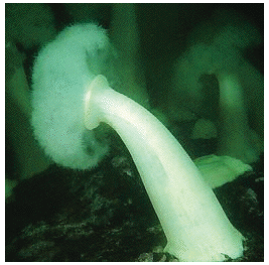
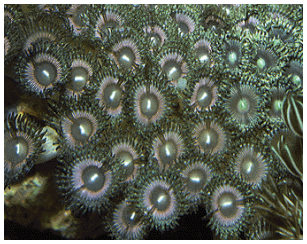
Cl. Hydrozoa
colonial hydroids
smaller jellyfish
siphonophores

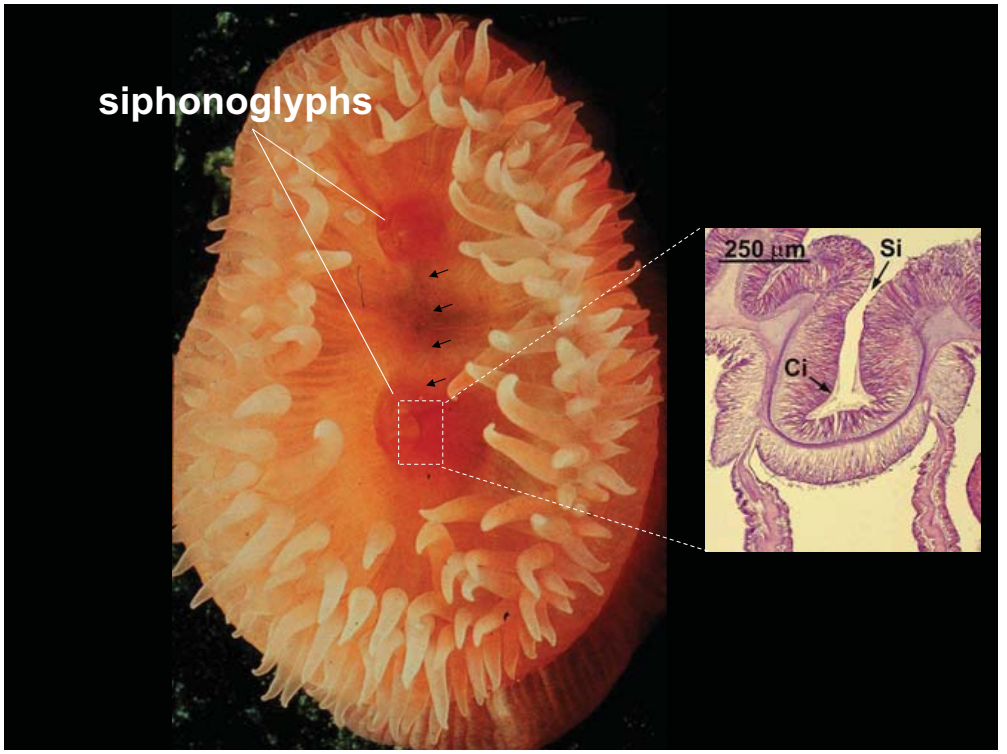
Cl. Anthozoa
• sea anemones
scleractinian corals
sea pens

Cl. Scyphozoa
large jellyfish
stauromedusae

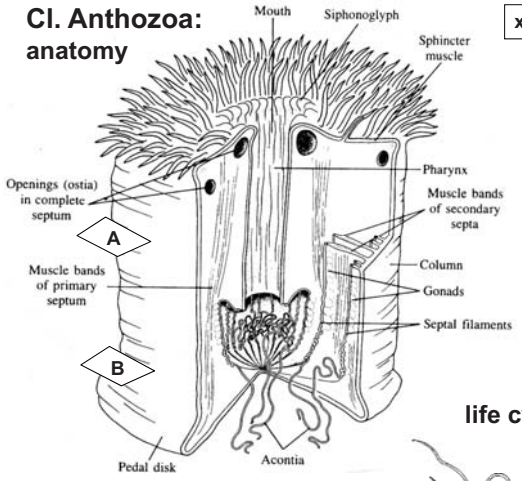
Cl. Cubozoa
sea wasps

Subcl. Hexacorallia
(= Subcl. Zoantharia)

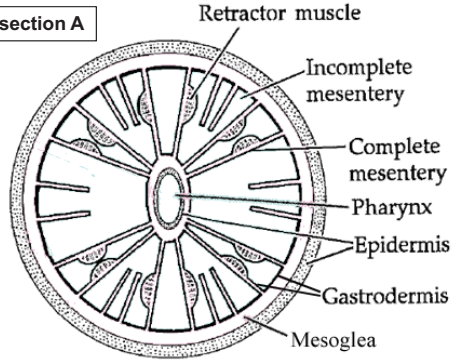




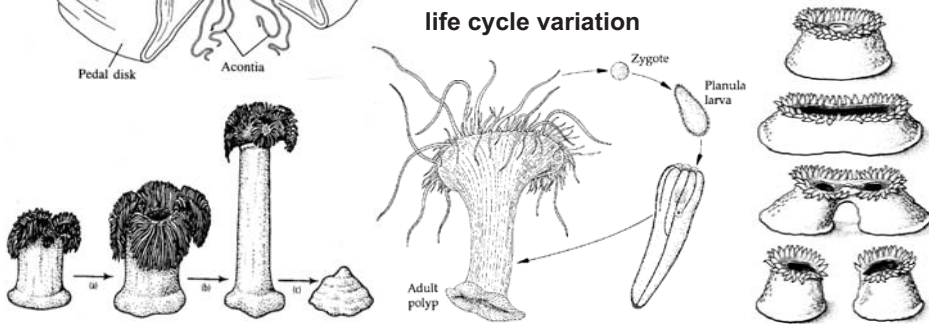
Cl. Anthozoa:
anatomy



x-section A



life cycle variation



Ph. Cnidaria

Cl. Hydrozoa
colonial hydroids
smaller jellyfish
siphonophores

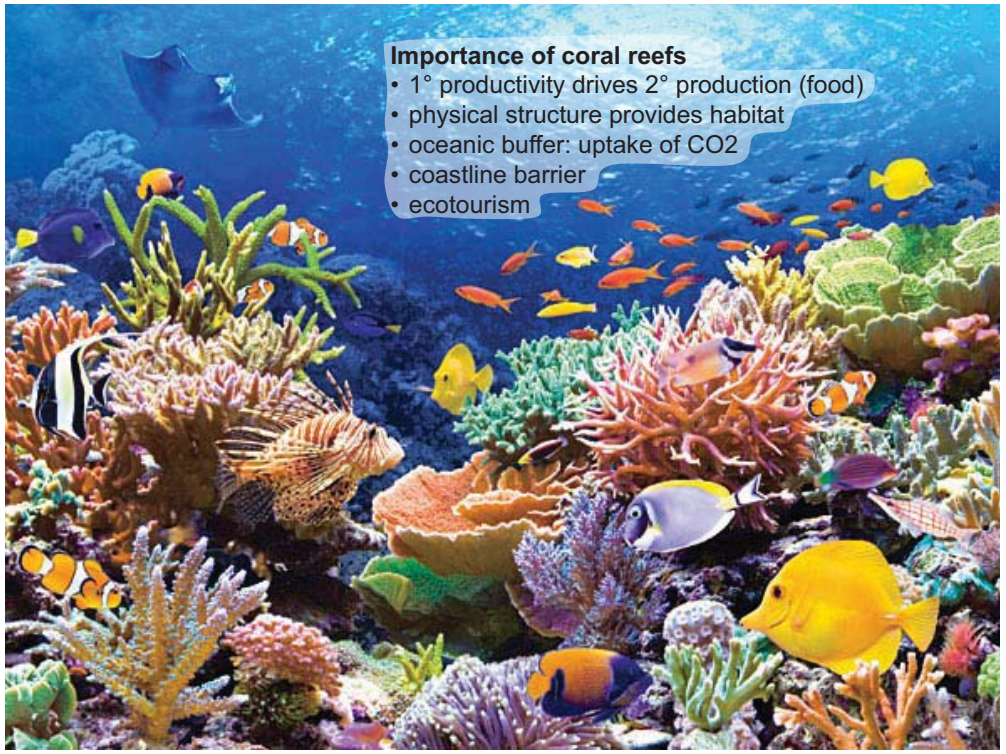
Cl. Anthozoa
sea anemones
• scleractinian corals
soft corals, sea pens, etc.

Cl. Scyphozoa
large jellyfish
stauromedusae

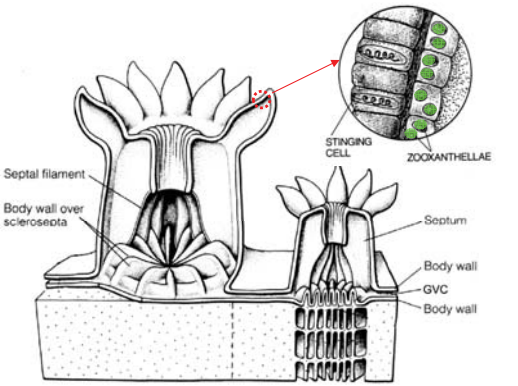
Cl. Cubozoa
sea wasps

Subcl. Hexacorallia
(= Zoantharia)



Q: Why are tropical coral reef waters so clear?



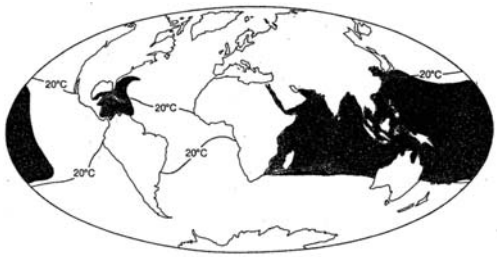
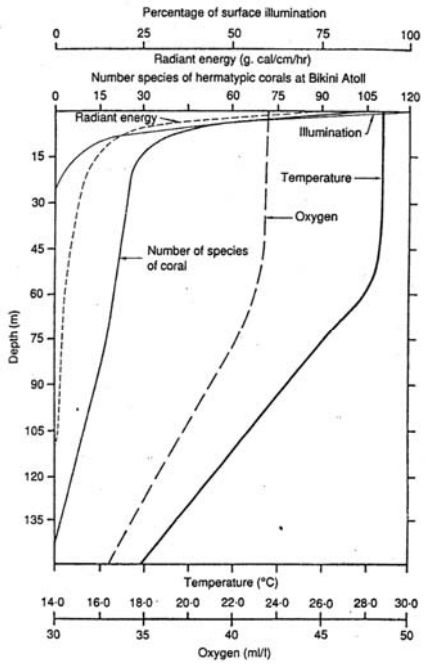


FIGURE 4–59 Distribution of coral reefs today (heavy shading).



Reef building by hermatypic corals

$Ca^{++} + 2HCO_3^- \Leftrightarrow CO_2 + H_2O + CaCO_3$ (insoluble)

Symbionts promote reef-building

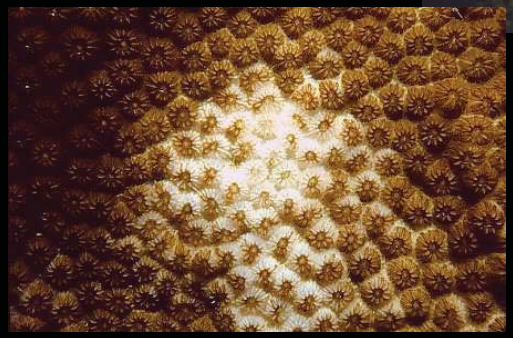
Coral bleaching

(symbiont) superoxide radicals peroxides hydroxide radicals

$O_2 \rightarrow O_2^- \rightarrow H_2O_2 \rightarrow OH^-$

Temp, UV

*** anti-oxidants**



Ph. Cnidaria

Cl. Hydrozoa
colonial hydroids
smaller jellyfish
siphonophores

Cl. Anthozoa
sea anemones
corals
• sea pens, gorgonians etc.

Cl. Scyphozoa
large jellyfish
stauromedusae

Cl. Cubozoa
sea wasps

Subcl. Octacorallia (= Alcyonaria)

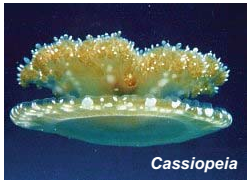
Ph. Cnidaria

Cl. Hydrozoa
colonial hydroids
smaller jellyfish
siphonophores

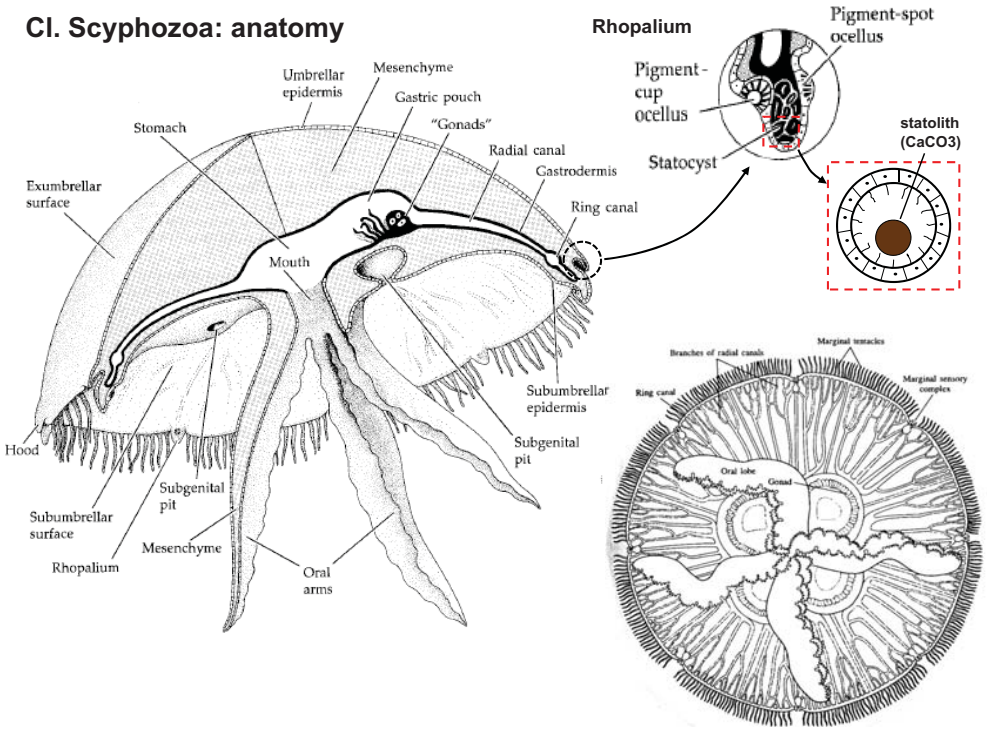
Cl. Anthozoa
sea anemones
corals
sea pens

Cl. Scyphozoa
• large jellyfish
stauromedusae

Cl. Cubozoa
sea wasps



Cl. Scyphozoa: anatomy



Cl. Scyphozoa

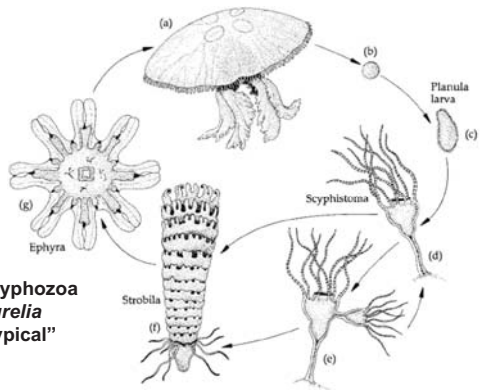
asexual reproduction: transverse division of entire polyp

scyphistoma
(polyp phase)

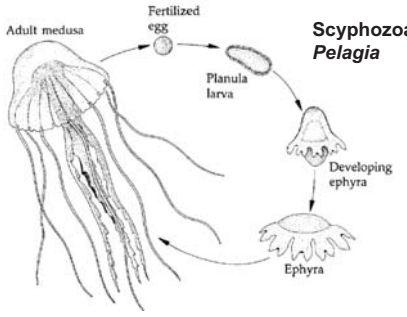
strobilation
(transverse division)

ephyrae
(young medusae)

Scyphozoan/Cubozoan life cycle variation

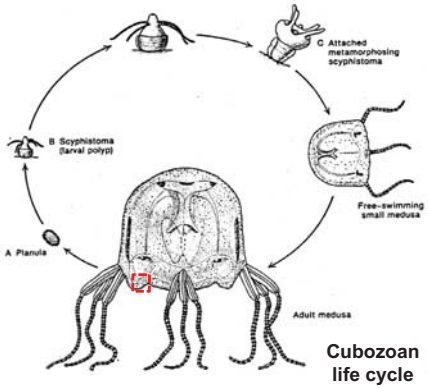


Scyphozoa
Aurelia
"typical"



Scyphozoa
Pelagia

Scyphozoa
O. Stauromedusae



Cubozoan life cycle

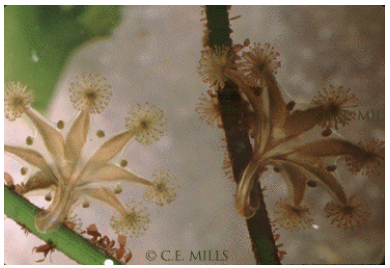
Ph. Cnidaria

Cl. Hydrozoa
colonial hydroids
smaller jellyfish
siphonophores

Cl. Anthozoa
sea anemones
corals
sea pens

Cl. Scyphozoa
large jellyfish
• stauromedusae

Cl. Cubozoa
sea wasps



Ph. Cnidaria

Cl. Hydrozoa
colonial hydroids
smaller jellyfish
siphonophores

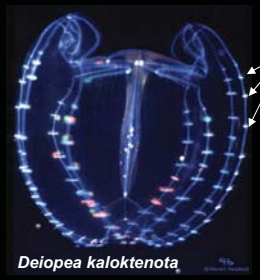
Cl. Anthozoa
sea anemones
corals
sea pens

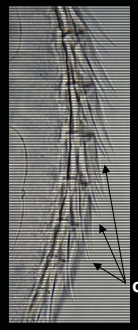
Cl. Scyphozoa
large jellyfish
stauromedusae

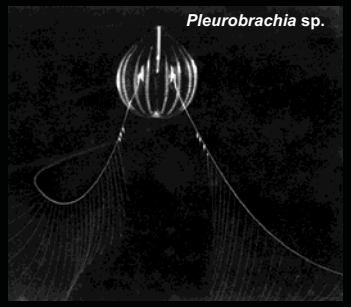
Cl. Cubozoa
sea wasps

Ph. Ctenophora

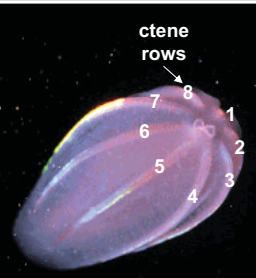
Cl. Tentaculata

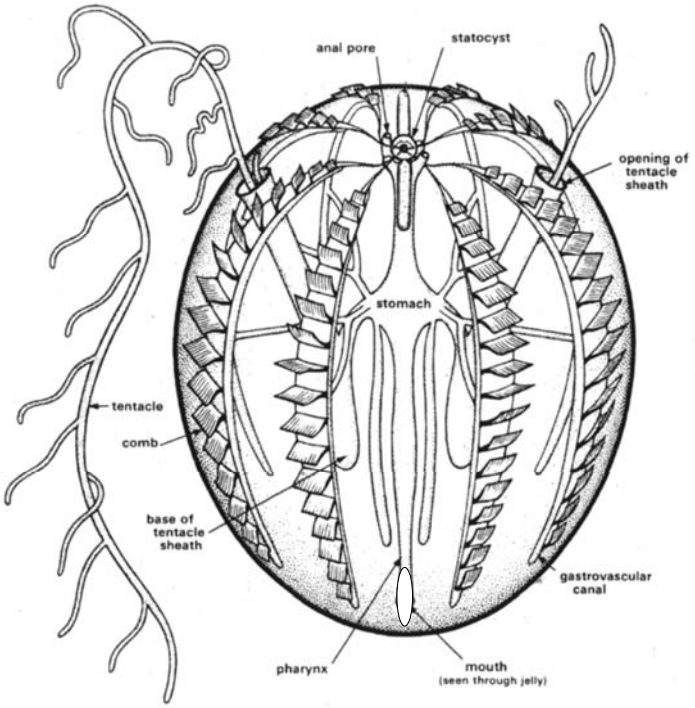






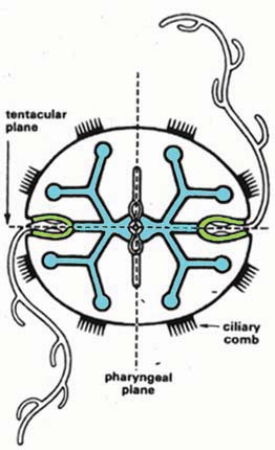
Cl. Nuda



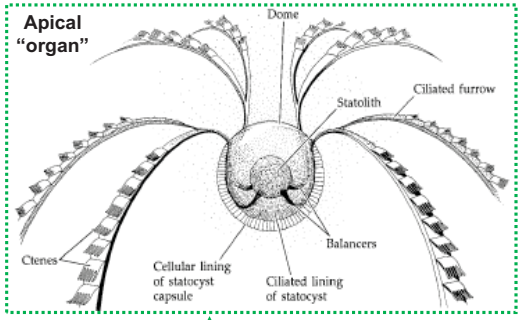


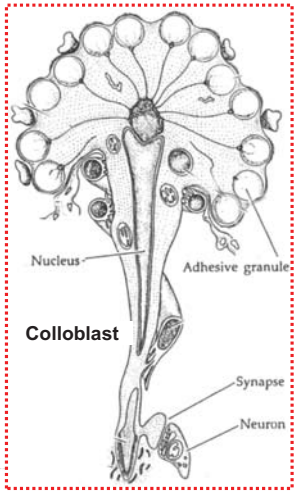
Ph. Ctenophora

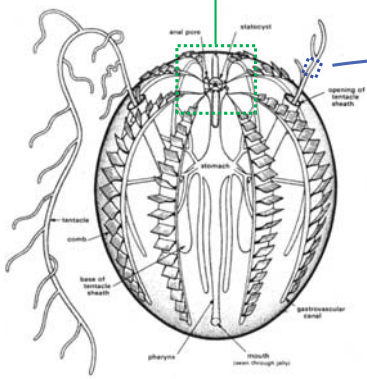
generalized body plan

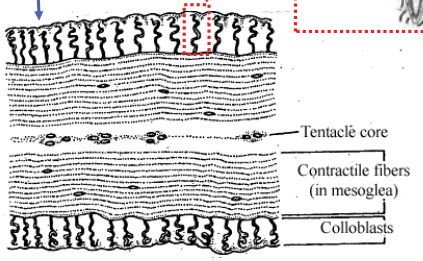


Biradial symmetry shown in a diagrammatic cross-section of *Pleurobrachia*. The dotted vertical line is the *pharyngeal plane*, in which pharynx and mouth are elongated. The dotted horizontal line is the *tentacular plane*. Pharyngeal halves are not equivalent to tentacular halves.



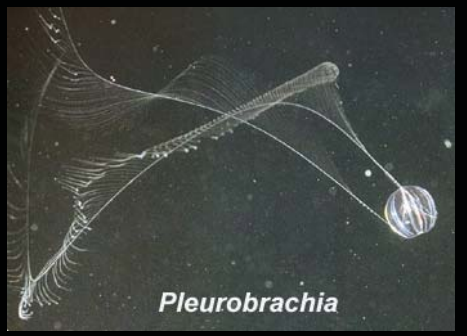


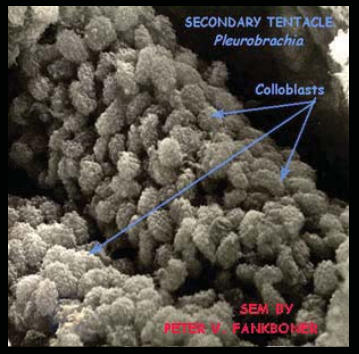




Feeding

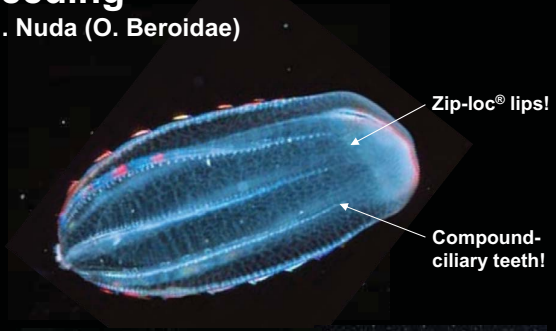
Cl. Tentaculata

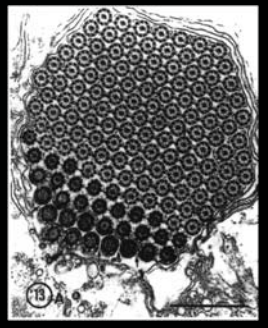


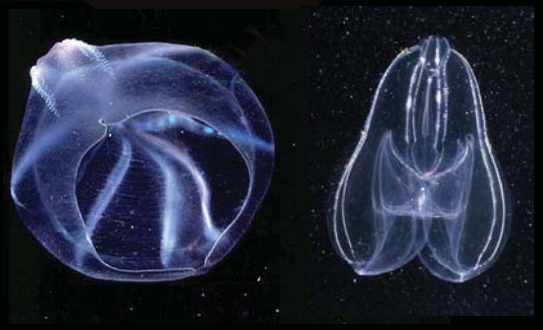


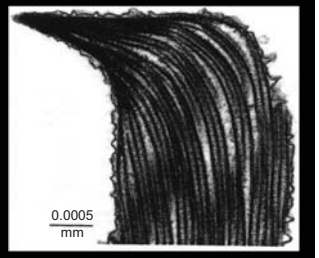
Feeding

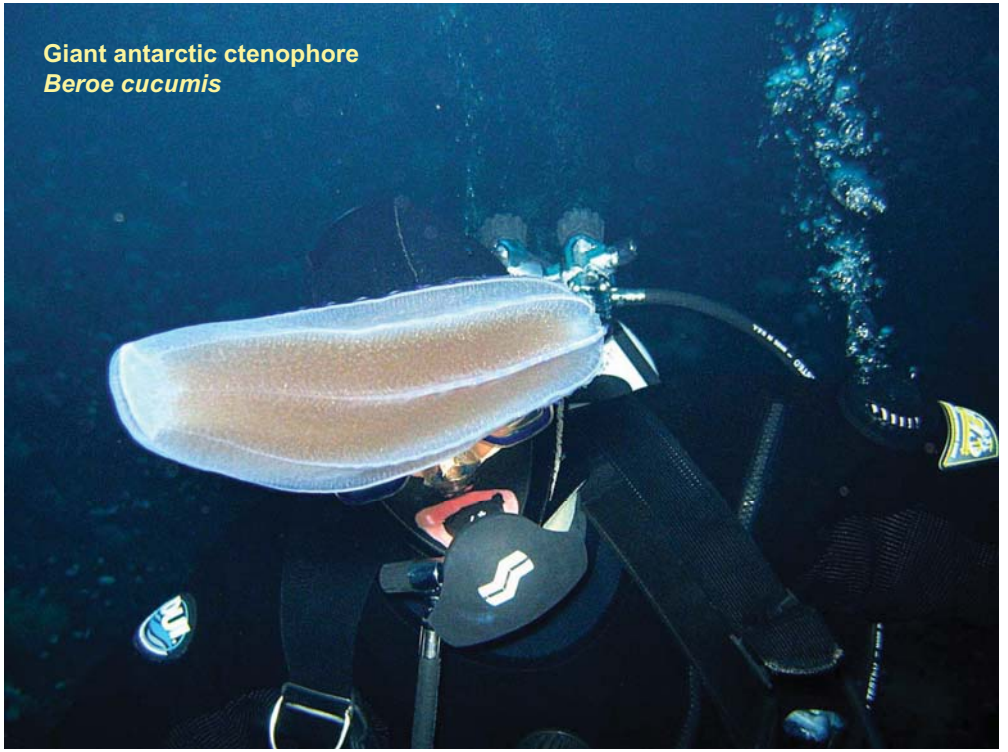
Cl. Nuda (O. Beroidae)





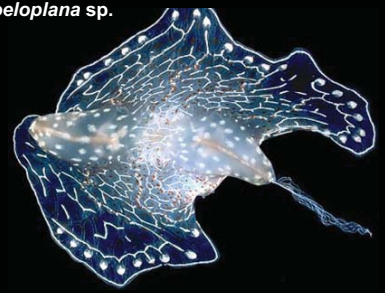


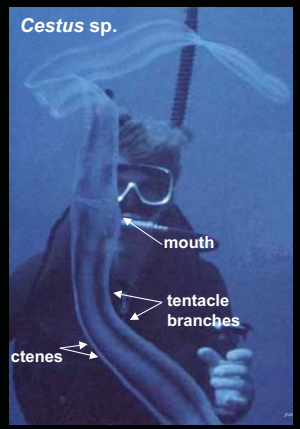


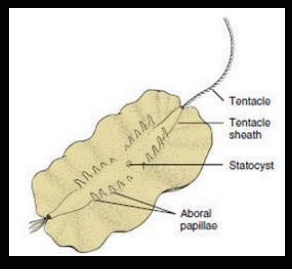


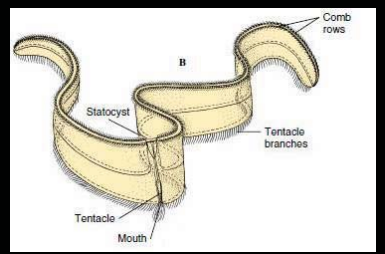
Unusual tentaculates

***Coeloplana* sp.**









Jelly plankton:

***homology* or *homoplasy* of habitat, transparency and feeding mode?**

Life cycle	Alternating generations	Typical
Swimming mechanism	“Muscular” contractions	Ciliary (8 ctene rows)
Symmetry	Radial	Biradial
“Muscle”	Epithelial	True fibers?
Food capture (cell)	Cnidocyte	Colloblast
(structure)	Nematocyst	Colloblast
(control)	Independent effectors	Nervous control
Larval development	Planula (indirect)	Cydippid (direct)
Cleavage	Indeterminate	Determinate